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A New Megasecopter from the Carboniferous of Kansas

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ABSTRACT: The order Megasecoptera has previously been represented in the American Carboniferous by only two fragmentary wings of doubtful affinities. A new fossil, *Parabrodia carboniara*, n. sp., found in the Upper Carboniferous of Garnett, Kan., and belonging to a new family, Parabrodiidæ, is a typical member of the order, closely related to the European Brodia. The type is in the Geological Museum of the University of Kansas.

THE Carboniferous members of the extinct order Megasecoptera are known almost exclusively from European deposits. Only two fossils¹ from the North American Carboniferous can be fitted into the order, and both of these are so fragmentary and aberrant that they were placed there only tentatively by Handlirsch. But a new fossil, recently found by M. K. Elias in the Carboniferous of Kansas, consists of a nearly complete wing typical of the European Megasecoptera of this horizon. To Mr. Elias and the authorities of the Geological Department of the University of Kansas I am indebted for the opportunity of studying this insect.

As we might expect from its unique geographical position, the fossil belongs to a new family:

PARABRODIIIDÆ, NEW FAMILY

Allied to the family Brodiidæ, from the English Carboniferous (Westphalian), but differing in the possession of a definite coalescence of MA with Rs.

1. *Raphidiopsis diversipenna* Scud., from Rhode Island, and *Prochoroptera calopteryx* Handl., from Mazon creek, Illinois.

PARABRODIA, NEW GENUS

Medium-sized insects; wings slender, probably subpetiolate; Sc extending well beyond the middle of the wing; Rs arising about the middle of the wing, almost immediately coalescing with MA; Rs 2-branched; M free from R at the base of the wing; MA unbranched; MP forked; Cu1 and Cu2 unbranched; Cu1 probably coalescing with M at the base of the wing.

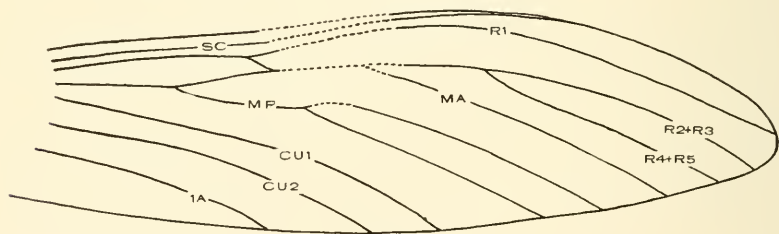
Genotype: *Parabrodia carbonaria* n. sp.

Parabrodia carbonaria n. sp.

(Figure 1)

Length of wing, 24 mm.; width, 7 mm.; apex pointed; Sc straight; R with a slight bend at the origin of Rs; R1 remote from the margin of the wing distally; MA fused with Rs for a distance about as long as its free part proximad of the coalescence; MP diverging apically of the origin of Rs and proximad of the divergence of MA from Rs; Cu1, Cu2, and 1A nearly parallel. No cross veins are preserved.

Holotype. In Geological Museum, University of Kansas; collected by M. K. Elias, six miles northwest of Garnett, Kan.² Horizon is the late middle Pennsylvanian.



TEXT FIGURE 1

The wing is preserved on a large slab of light-brown shale, containing remains of *Walchia* and other plants, one of which overlies a part of the anterior margin. The veins are only faintly preserved, and in making the accompanying figure I have used to advantage an excellent photograph provided by Mr. Elias.

As I have mentioned above, *Parabrodia* is especially interesting because it is the first typical Megasecopteran to be found in a satisfactory state of preservation in the Carboniferous of North America.

2. The locality is mentioned in the abstract "Conifer Forest of Late Middle Pennsylvania Time," by Mr. Elias, published in the Proceedings of the Paleontological Society: Bull. Geol. Soc. Amer., 43:285; 1932.

The shape of the wing is closest to that of the members of the family Brodiidæ, but in the latter the anterior media (MA) does not quite coalesce with Rs, and the radial sector (Rs) has five branches. If my interpretation of the formation of Rs, i. e., its division into $R2 + 3$ and $R4 + 5$, is correct, then the structure of the vein approaches that of Raphidiopsis and the Permian Protohymenoptera. But, unfortunately, the convexity and concavity of the veins are not preserved, and it is possible that the vein which I have named MA really consists of a compound vein formed by the fusion of MA and $R4 + 5$, and that the independent branches of Rs are R2 and R3. In either case the venation as a whole could easily be derived from that of the Brodiidæ or some closely related family.